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Phytochemical Analysis and Antibacterial Activity of *Psidium Guajava* against Some Clinical Pathogens

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ABSTRACT

The some plants have been good source of drugs for microbial resistance. The research for newer source of antibiotics is a global challenges in pharmaceutical companies. Present time plants are being extensively explored for harboring medicinal properties. Phytochemical are naturally occurring compounds present in the medicinal plants such as flavonoids, steroids, alkaloids and phenolic compounds. *Psidium guajava* is a phototherapeutic plant used in folk medicine and is believed to have active components that helps in treatment and management of various disease such as wounds, ulcers, etc. Guava extract has exhibited remarkable antimicrobial activity against microorganisms. This study investigates the phytochemical and antibacterial properties of *Psidium guajava* leaf extracts. Antibacterial activity at the plant extract were determined against *K. pneumoniae*, *S. aureus*, *E. coli*. *Psidium guajava* leaf extracts provided scientific evidence for the rational use of *P. juajava* leaves in prevention of disorders due to Presence of some useful phytochemicals and in the treatment of disease caused by some bacterial pathogens such as *S. aureus*, *B. cereus*, *K. pneumonae*, *E. coli.* The present work demonstrates the antimicrobial potential of *Psidium guajava* leaves extracts by using various solvents.

KEYWORDS: *Antimicrobial, Psidium guajava, Phytochemical, Disease, Extracts*

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INTRODUCTION

Plants have been good source of drugs for humanity from the most primitive time. The development of the modern medicine remains rooted to the medicinal plants. The research for newer source of antibiotics is a global challenge in pharmaceutical companies. (1). In recent scenario of medical and pharmaceutical advancement, microbes involve in the change of their metabolism and genetic structure to acquire resistant against the drugs used in the treatment of common infectious disease. To overcome microbial drug resistant scientists are looking forward for the development of alternative and novel. Nature such as plant, algae and animal provides on array of natural medicinal compounds for the treatment of various infectious disease. In recent time plants are being extensively explored for harboring medicinal properties. Studies by various researches have provide that are one of the major source for drug discovery and development. Plants are reported to have antimicrobial, anticancerous, anti-inflammatory, anti-diabetic, hemolytic, antioxidant properties etc.(2).The presence of phytochemical constituents in medicinal plants made them useful for healing as well as caring of human disease. Phytochemicals are naturally occurring compounds in the medicinal plants such as flavonoids, steroids, alkaloids and phenolic compounds.(3). The guava *(psidium guajava)*, belongs to the family Myrtaceae which is considered to have originated in tropical South America. Guava crops are grown in tropical and subtropical areas of the world like Asia, Hawaii, Florida and others. The genus *Psidium* comprise approximately 150 species of small trees and shrubs. The guava leaves are 2 to 6 inches large and 1 to 2 inches wide, aromatic when crushed, and appear dull- green with stiff but Coriaceous with pronounced veins. (4). *Psidium guajava* is a phototherapeutic plant used in folk medicine and is believed to have active components that helps in treatment and management of various disease such as wounds, ulcers, diarrhea, cholera, hypertension, obesity, and the control of diabetic mellitus etc. Guava extract has exhibited remarkable antimicrobial activity against microorganisms like *Bacillus, E. coli, Klebsiella, Clostridium, Salmonella* species. This study investigates the phytochemical and antibacterial properties of *Psidium guajava* leaf extract. (5).

Material and Methods:-

Collection of Plant Materials - The Fresh leaves of Guava were collected from Harda district Madhya Pradesh into plastic zip lock bags with appropriate labelling.

Prepare Of Extracts - The leaf sample were washed in tap water, dried and placed into a blander to be grounded in powder three solvents were arranged in increasing polarity methanol (>95%), ethanol (>99.5%) and distilled water. The leaf powder was added to each of solvents to make a 20%

concentration. The mixers were made in sterile flask for 3 days .The flasks were placed on a platform shake at 70 rpm. After 3 days of soaking in solvents the mixtures were transferred to 50 ml tubes and centrifuged for 10 min. at 4,000 rpm at 25°C. The supernatant was collected and started at 4°C until use.(6,7)

Phytochemical Analysis –

Test for Saponin - Added 2ml distilled water in the extracts suspended in Ethanol and was shaken vigorously. The formation of foam layer indicate the presence at saponins. (8)

Test for Terpenoids - 1ml at acetic anhydride at 5 drop of concentrated sulphuric acid as added to the extracts. A colour change from violet to blue confirm the presence of steroids and the formation of blue-green ring indicates the presence of terpenoids.

Test for tannins - extracts were treated with 1ml of 5% ferric chloride. Presence of tannin was indicated by the formation of bluish black or greenish Black precipitate. (9)

Test for glycoside - Extract was mixed with 2 mL of glacial acetic acid containing drops of 2% $FeCl_3$ the mixture was poured into another tube containing 2ml at concentrated sulphuric acid. A brown ring at the interphase indicates the presence of glycosides.(10)

Test for flavonoids - Few fragments of magnesium metal ribbon (3-4 pieces) was added to 1 ml of the extracts, followed by drop wise addition of concentrated hydrochloric acid. Formation of pink or red colour indicated the presence of Flavonoids.

Test of isolation - The following four clinical isolate of Bactria were used for the study *Staphylococcus aureus*, *Klebsillea pneumoniae*, *Bacillus cereus*, *E. coli*. All these cultures were maintained on nutrient agar plates at 4°C. (11,12)

Antibacterial susceptibility test- The plant extracts Antimicrobial activities of the plant extract was tested using well diffusion method. Were tested on Mueller Hinton II plates to detect the presence of antibacterial activity. Wells were mode on the Mueller Hinton agar surface with 5mm cork borer. The extract were poured in the well using sterile syringe. The plates were incubated at 37°C for 24 hrs. The plates were observed for the zone formation around the well and were measured in millimetre (mm) ciproflaxin (5mg) was used as control. (13, 14)

Results and Discussion - The main object of present study was to evaluate the phytochemical analysis and antibacterial activity of *P. guajava* leaves. The result obtained in the present study provides a scientific support to use at plant in the treatment of microbial disease.

The qualitative screening at phytochemical properties of *P. guajava* leave extracts showed the presence of moderate quantities (+) and large quantities at Saponins, Terpenoids, Tannis, Glycoside, Flavonoids in the different solvents used.

Table – 1 Phytochemical test on solvents fractions at *P. guajava* leave extracts

Fraction	Saponins	Terpenoids	Tannins	Glycoside	Flavonoids
Methanol	+	+	++	+	++
Ethanol	-	+	+	-	+
Aqueous	+	+	+	+	+

- = Absent, + = Present in moderate Quantity. ++ =Present in large Quantity

The analysis of the plant extracts revealed the presence of phytochemical which are known to exhibit medical and physiological activities. For example Saponins which are glycoside have been found to have inhibitory effect on gram positive bacteria *S. aureus*. Terpenoids mainly used for their aromatic qualities have also been found to be potential agents against inhibition bacteria. Tannins are polyphenolic compound that bind to proline rich protein that interferes with protein synthesis and has shown to have antibacterial activity.

The antibacterial activity at the *P. guajave* leaves extract was quantitatively assessed by the presence or absence at inhibition zone and diameter respectively. Antibacterial activity at the plant extract were determined by well diffusion method against test bacteria colonies. The leaf of ethenolic and aqueous extract showed inhibition activity on *K. preumoniae* was (11mm) ; Methanol extract showed activity on and *S. aureus* (12mm) *B. cereus* (8.29mm), *E. coli* (2.0mm) and ethanol extract showed activity on *S. aureus* (10mm), *B. cereus* (6.9mm) and *E. coli* (14mm)

Table – 2 Antibacterial analysis *P. guajava* leaf extract.

S. No	Test organism	Leaf extract		
		Methanol	Ethanol	Aqueous
1.	S. aureus	12 mm	10 mm	-
2.	K. pneumoniae	-	12 mm	11mm
3.	B. cereus	8.29 mm	6.9 mm	-
4.	E. coli	2.0 mm	14 mm	-

Zone of inhibition in mm

Conclusion:

The phytochemical and antimicrobial studies of *P. guajava* leaf extracts provided scientific evidence for the rationale use of *P. juajava* leaves in prevention of disorders due to Presence of some useful phytochemicals and in the treatment of disease caused by some Bacterial pathogens such as *B. aureus, B. cereus, K. pneumonae, E-coli.* The present work demonstrates the antimicrobial potential of *Psidium guajava* leaves extract by using various solvents. The results

indicate that ethanol and methanol are better than aqueous solvent for the extraction of antibacterial properties of guava. The antimicrobial activity of ethanolic and methanolic extract of the plant of the selected bacterial pathogens were identified. Guava fruits Recommended to take daily for good health.

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